Biopsies for grading of shoulder ulcerations in sows

Jensen, Henrik Elvang; Dahl-Pedersen, Kirstin

Publication date:
2010

Document version
Publisher's PDF, also known as Version of record

P.854

Biopsies for grading of shoulder ulcerations in sows

Henrik E. Jensen; Kirstin Dahl-Pedersen

University of Copenhagen, Frederiksberg, Denmark

Introduction

The presence of shoulder ulcerations in sows commonly develop and signal poor animal welfare (1). Presence of shoulder ulcerations is due to pressure and is significantly related to the laying bout duration (2, 3). Clinically, it may be difficult to state the presence of an ulceration. Moreover, it is not always straight forward to deduct the progression of shoulder ulcerations (4). With reference to national strategies initiated towards limiting the presence of shoulder ulcerations, an intervention must be initiated when the ulceration has penetrated into the subcutaneous tissue. Therefore, different para-clinical techniques should be evaluated for the characterization of ulcerations. Such techniques should enable one to state the presence or absence of an ulceration and preferably aide for grading the ulceration.

Based on pathology, shoulder ulcerations are graded 1-4 according to the progression into the different anatomical structures of the shoulder region with the following characteristics (1,3): Stage 1) the ulceration is limited to the epidermis (necrotic or sloughed off), and may be covered with a scab. Stage 2) the dermis is ulcerated and may be covered with a scab. Usually a small amount of granulation tissue or fibrosis is bordering the ulcer. Stage 3) the subcutaneous tissue is ulcerating and may be covered with a scab. It is accomplished by heavy formation of granulation tissue or fibrosis towards the surroundings. Stage 4) an ulceration with exposed bone (tuber spina scapula). Stage 4 ulcerations are always accompanied by a heavy proliferation of new osseous tissue. Shoulders free of ulcerations are scored as stage 0 (3).

In the present study, the diagnosis of shoulder ulcerations based on the examination of a single biopsy taken from the skin overlaying tuber spina scapula, i.e. centrally from the ulcer when present, was compared with the classical method implying examination of cross-sectioned shoulder areas during necropsy.

Materials and Methods

Shoulder regions from 33 sows admitted to the department for necropsy were evaluated. Before cross-sectioning and grading the shoulder ulcerations, a punch biopsy (8 mm in diameter, KRUUSE, Denmark) was taken from the skin overlaying tuber spina scapula from animals without ulcerations, and centrally from the ulcer when present. Tissue specimens were fixed in 10% neutral buffered formalin for 7 days, processed through graded concentrations of ethanol and xylen and embedded in paraffin wax. Tissue sections were cut at 4-5 µm and stained with haematoxylin and eosin (HE). The grading of ulceration stages from the biopsies was compared with the grading based on the cross-section method (3).

Results

The cross-section method revealed the following pattern of shoulder ulcerations: stage 0 = 16; stage 1= 0; stage 2 = 4; stag 3 = 13; and stage 4 = 0. In five cases, the stage of ulceration was based on gross examination because the sections taken for histology were all bordered by granulation tissue, i.e. the involved tissues of the skin could not be judged histologically. Presence (n=17) or absence (n=16) of an ulceration, as assessed by cross-sectioning the shoulders, was in all cases verified in th biopsies. In the biopsies, four cases of both stage 2 and stage 3 ulcerations were confirmed, too. However, in four and five case of stage 3 ulcerations the biopsies deducted the ulcerations be ing stage 2 or at least stage 2 ulcerations, respectively.

Discussion

Examination of a single biopsy taken from the skin overlaying tuber spina scapula in all cases enabled one to settle whether an ulceration was present or not. Moreover, in eight sows with ulcerations a correct stage was documented in the biopsies.

In four out of nine stage 3 ulcerations, however, the biopsies showed a stage 2 ulceration, and in five out of nine stage 3 ulcerations the biopsies revealed stage 2 ulceration at least. Du to the limited tissue sampled by a punch biopsy, however, som ulcerations are difficult to grade because the material is mainly made up by granulation tissue.

In conclusion, a single biopsy is sufficient for stating the presence of an ulceration and when a stage 3 ulceration is documented in a single biopsy it is in accordance with the cross-section method. Moreover, a major advantage of punch biopsie is that they can be sampled from living animals.

References

1. Lund et al. (2003). Danish Vet. J. 86, 8-11.
2. Jensen (2009). Vet. Rec. 165, 171-174.
3. Rolandsdotter et al. (2009). Acta Vet. Scand. 51, 44-59.
4. Vestergaard et al. (2007) Danish Pig production Medd. 798, 1-12